

**TITLE:** Use of CUSUM to Monitor Trends of Birth Defects in New York State

**KEYWORDS:** epidemiology; birth defects; surveillance; CUSUM; quality control; trends

**BACKGROUND:** Temporal analysis of birth defects is useful for detecting changes in rates. Further investigation can be carried out to find the cause. The reported prevalence of birth defects can vary due to differences in case ascertainment and surveillance practices as well as true changes in prevalence.

**OBJECTIVE:** We examine the utility of Cumulative sum (CUSUM) charts for detecting trends in birth defects.

**METHODS:** New York State Congenital Malformations Registry data from 1992 to 1999 were used. Rates of malformations were analyzed using self-starting binomial CUSUM and Shewhart charts for four regions of New York State. We investigated obstructive renal defects because it is widely known that increased use of ultrasound has lead to an increase in diagnosis. Oral clefts were also evaluated because they are clearly recognizable; any increase might represent a true increase in prevalence.

**RESULTS:** Rates of obstructive renal defects increased in all regions of New York State. These increases were detected at different times in each region. Reports of oral cleft defects increased only in Long Island.

**CONCLUSIONS:** The increase in reports of obstructive renal defects is likely due to the increased use of and improvements in diagnostic imaging techniques, which may have been introduced at different times across the state. Since we detected this expected increase using CUSUM, this method is useful for identifying changes in birth defect reporting. The increased prevalence of oral clefts on Long Island may be related to underreporting of cases in the earlier years.

**EVALUATION:** CUSUM charts are useful in detecting small, sustained increases in rates over time while Shewhart charts can detect large sharp increases, are more intuitive, and therefore may have advantages for communication purposes.

**AUTHORS:**

Gwen Babcock, M.S.  
Environmental Health Surveillance Section  
Bureau of Environmental & Occupational Epidemiology  
New York State Department of Health  
547 River Street, Rm. 200  
Troy, NY 12180-2216  
[gdb02@health.state.ny.us](mailto:gdb02@health.state.ny.us)  
Phone: (518) 402-7990  
Fax: (518) 402-7959

Thomas Talbot, [tot01@health.state.ny.us](mailto:tot01@health.state.ny.us)  
Syni-An Hwang, [sah02@health.state.ny.us](mailto:sah02@health.state.ny.us)  
Charlotte Druschel, [cmb05@health.state.ny.us](mailto:cmb05@health.state.ny.us)  
Steven Forand, [spf02@health.state.ny.us](mailto:spf02@health.state.ny.us)